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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/084,641	02/27/2002	Masaaki Ikeda	15115.018001	3692
22511	7590	09/08/2004	EXAMINER	
OSHA & MAY L.L.P.			MARKHAM, WESLEY D	
1221 MCKINNEY STREET			ART UNIT	
HOUSTON, TX 77010			PAPER NUMBER	

1762

DATE MAILED: 09/08/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/084,641

Applicant(s)

IKEDA ET AL.

Examiner

Wesley D Markham

Art Unit

1762

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 02 July 2004.
2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-31 is/are pending in the application.
4a) Of the above claim(s) 6-29 and 31 is/are withdrawn from consideration.
5) ☐ Claim(s) _____ is/are allowed.
6) ☒ Claim(s) 1-5 and 30 is/are rejected.
7) ☐ Claim(s) _____ is/are objected to.
8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
10) ☒ The drawing(s) filed on 27 February 2002 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☒ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 8/13/02.
4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

1. Applicant's election without traverse of Group I, Claims 1 – 5 and 30, in the reply filed on 7/2/2004 is acknowledged. As such, Claims 6 – 29 and 31 are withdrawn from further consideration by the examiner as being drawn to a non-elected invention. An Office Action on the merits follows.

Information Disclosure Statement

2. The IDS filed by the applicant on 8/13/2002 is acknowledged, and the references listed thereon have been considered by the examiner as indicated on the attached copy of the PTO-1449 form.

Oath/Declaration

3. The oath or declaration is defective. A new oath or declaration in compliance with 37 CFR 1.67(a) identifying this application by application number and filing date is required. See MPEP §§ 602.01 and 602.02. The oath or declaration is defective because it incorrectly states that the foreign priority document (JP 2001-056693) was filed on 3/3/2001 when the aforementioned document appears to have been filed on 3/1/2001.

Priority

4. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d) (i.e., a certified copy of Japanese priority document 2001-056693), which papers have been placed of record in the file.

Drawings

5. The formal drawings filed on 2/27/2002 are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference character(s) not mentioned in the description: "2a" and "2b" in Figures 8, 10, 11D, and 13; "5c" and "5d" in Figure 11C; "29Ba" and "29Bb" in Figure 13; and "3" in Figures 14A – 14C. Corrected drawing sheets in compliance with 37 CFR 1.121(d), or amendment to the specification to add the reference character(s) in the description in compliance with 37 CFR 1.121(b) are required in reply to the Office Action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

6. The lengthy specification (39 pages, exclusive of the claims) has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:
- (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.
8. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

9. Claims 1, 2, and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Funahata et al. (US 2002/0054259 A1) in view of Michel et al. (USPN 5,759,616), Tanaka et al. (JP 03-149803 A), and Corley (USPN 5,338,782).
10. Regarding independent **Claims 1 and 30**, Funahata et al. teaches a method for manufacturing an optical device, specifically a reflection plate (Abstract, paragraphs [0001], [0014], and [0019]), the method comprising the steps of (1) coating a substrate "1" with a resin thin layer "2", (2) drying the resin thin layer, (3) pressing a stamp "19" or "21" having an "inverted micro-asperity pattern" against the resin thin layer such that a micro-asperity pattern is formed on a surface of the resin thin layer, (4) separating the stamp from the resin thin layer, and (5) forming a reflection film "3" and an alignment film "9" on the resin layer having the micro-asperity pattern thereon (Figures 2A – 2H and 3A – 3H; paragraphs [0001], [0019], [0037] – [0043], [0053] – [0057], [0066], [0067], and [0096] – [0106]). Funahata et al. does not explicitly teach that (1) the temperature of the resin thin layer is controlled lower than a polymerization reaction starting temperature and the resin is not substantially polymerized during the coating step, (2) the resin layer is cured by heating to a temperature higher than the polymerization reaction starting temperature and the glass-transition temperature but lower than a thermal decomposition starting temperature of the resin so that the resin thin layer is polymerized on the substrate (i.e., to form a resin thin film) prior to the stamping step, and (3) the resin thin film is cooled to a temperature lower than the glass-transition temperature. However, Funahata et al. does teach that the resin is coated on the substrate by means of

spinner-coating, which indicates to one of ordinary skill in the art that the resin is coated onto the substrate in a liquid form (paragraph [0097]). Michel et al. teaches that, in the art of depositing a resin layer on a substrate prior to impressing a pattern into the layer with a molding tool (i.e., a process analogous to that of Funahata et al.), the layer is polymerized on the substrate (Col.2, lines 27 – 67, Col.3, lines 1 and 35 – 40). Therefore, it would have been obvious to one of ordinary skill in the art to control the temperature of the resin during the coating step to be lower than a polymerization reaction starting temperature because, by doing so, one would insure that the resin thin layer would be polymerized on the substrate, as taught by Michel et al., and not substantially polymerized prior to its application to the substrate. By controlling the temperature of the resin during the coating step to be lower than a polymerization reaction starting temperature and insuring that the resin is not substantially polymerized, one of ordinary skill in the art would have also reaped the benefit of insuring that the resin remains in a liquid form during the coating step, a necessity in the spin-coating process taught by Funahata et al. In other words, if the resin of Funahata et al. was applied at a temperature above the polymerization reaction starting temperature and was substantially polymerized, one of ordinary skill in the art would have expected the spin-coating process used to deposit the resin layer to be much more difficult. Regarding the curing step, Michel et al. teaches that, in the art of depositing a resin layer on a substrate prior to impressing a pattern into the layer with a molding tool (i.e., a process analogous to that of Funahata et al.), the layer is polymerized on the substrate, and the pressure and temperature at

which polymerization takes place has a large influence on the strength of the layer (Col.3, lines 1 – 40). In other words, Michel et al. teaches that the temperature at which a resin layer (i.e., which is subsequently stamped) is polymerized is a result / effective variable that determines the strength of the resulting layer. Further, Tanaka et al. teaches that it was known in the art of curing resins at the time of the applicant's invention to cure a resin at a temperature higher than the glass-transition temperature of the resin (Abstract), and Corley teaches that, when thermally curing a resin at a temperature above the glass-transition temperature of the resin, the temperature should always be lower than the temperature at which degradation of the polymer will occur at significant rates (Col.5, lines 6 – 23). Therefore, it would have been obvious to one of ordinary skill in the art to optimize the temperature at which the resin layer of Funahata et al. is cured prior to stamping (as taught by Michel et al.) as a result / effective variable through routine experimentation in order to desirably influence the strength of the resulting layer. As evidenced by the teachings of Tanaka et al. and Corley, this optimization would have been reasonably expected by one of ordinary skill in the art to include heating / curing temperatures higher than the polymerization reaction starting temperature (i.e., because such a temperature is necessary for polymerization of the layer) and the glass-transition temperature (see Tanaka et al.), but lower than the thermal decomposition starting temperature of the resin (see Corley). Regarding the cooling step, Michel et al. teaches that, after polymerization of the layer on the substrate (i.e., after forming the resin thin film), the resin thin film should be tempered and cooled at temperatures

below the glass transition temperature in order to relax the film and avoid internal tensions in the film (Col.3, lines 9 – 20 and 35 – 36). Therefore, it would have been obvious to one of ordinary skill in the art to cool the resin thin film of Funahata et al. to a temperature below the glass-transition temperature in order to relax the cured film and avoid internal tensions in the film, as taught by Michel et al. Regarding **Claim 2**, Funahata et al. also teaches that the pattern of concave and convex portions (i.e., the micro-asperity pattern) is formed on the resin film by rolling a roll-shaped pressing die “21” against the surface of the film (Figure 3A, paragraph [0103]). To make the pattern of concave and convex portions represented in Figure 3A with roll-shaped pressing die “21”, the die necessarily contacts the film a plurality of times (i.e., as it is being rolled over the surface), and as such, the “stamp is pressed against the resin thin film a plurality of times”, as required by Claim 2.

11. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Funahata et al. (US 2002/0054259 A1) in view of Michel et al. (USPN 5,759,616), Tanaka et al. (JP 03-149803 A), and Corley (USPN 5,338,782), in further view of Biebuyck et al. (USPN 5,817,242).

12. The combination of Funahata et al., Michel et al., Tanaka et al., and Corley teaches all the limitations of **Claim 3** as set forth above in paragraph 10, except for a method wherein the substrate is provided with an alignment mark thereon such that the stamp can be placed on the substrate in a manner that the alignment mark provided on the substrate matches a reference position of the stamp. However, Biebuyck et

al. teaches that, in the art of stamping a pattern onto a substrate, it is desirable to provide an alignment mark "301" on the substrate so that the stamp "31" can be placed on the substrate in a manner that the alignment mark on the substrate matches a reference position "311" on the stamp (Figure 3; Col.1, lines 3 – 5, Col.2, lines 54 – 65, Col.4, lines 13 – 25). This arrangement self-aligns the stamp with the substrate and insures that the stamp is guided into the desired final (i.e., stamping) position (Col.2, lines 54 – 59). Therefore, it would have been obvious to one of ordinary skill in the art to provide the substrate of Funahata et al. with an alignment mark thereon such that the stamp can be placed on the substrate in a manner that the alignment mark provided on the substrate matches a reference position of the stamp, as taught by Biebuyck et al., with the reasonable expectation of successfully and advantageously insuring that the stamping process of Funahata et al. produces the pattern of concave and convex portions in the specific location on the resin film desired by the purveyor in the art (i.e., due to the alignment marks), thereby increasing the accuracy and repeatability of the process.

13. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Funahata et al. (US 2002/0054259 A1) in view of Michel et al. (USPN 5,759,616), Tanaka et al. (JP 03-149803 A), and Corley (USPN 5,338,782), in further view of Yamada (JP 63-269347 A).
14. The combination of Funahata et al., Michel et al., Tanaka et al., and Corley teaches all the limitations of **Claim 4** as set forth above in paragraph 10, except for a method

wherein the micro-asperity pattern is formed on the surface of the resin thin film in an inert gas atmosphere. Specifically, Funahata et al. is silent regarding the nature of the atmosphere in which the stamping is carried out. Yamada teaches that, by carrying out a resin film stamping process in an inert gaseous atmosphere, the intrusion of air bubbles into the resin due to the stamping is prevented (Abstract). Therefore, it would have been obvious to one of ordinary skill in the art to perform the stamping process of Funahata et al. (i.e., the process of forming the micro-asperity pattern on the surface of the resin thin film) in an inert gas atmosphere, as taught by Yamada, with the reasonable expectation of successfully and advantageously preventing air bubbles from intruding into the resin film during the stamping process.

15. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Funahata et al. (US 2002/0054259 A1) in view of Michel et al. (USPN 5,759,616), Tanaka et al. (JP 03-149803 A), and Corley (USPN 5,338,782), in further view of Ono et al. (USPN 6,075,652).
16. The combination of Funahata et al., Michel et al., Tanaka et al., and Corley teaches all the limitations of **Claim 5** as set forth above in paragraph 10, except for a method wherein the micro-asperity pattern is formed on the surface of the resin thin film in a chamber, and the pressure inside the chamber is maintained lower than atmospheric pressure. Specifically, Funahata et al. is silent regarding the pressure at which the stamping is carried out. Ono et al. teaches that, in the art of stamping a pattern into

a coating, the stamping / pattern forming operation should be carried out in a vacuum chamber in order to prevent air from being entrapped in the irregularities of the stamper, which would prevent the formation of a uniform transferred surface (Col.11, lines 62 – 67). Therefore, it would have been obvious to one of ordinary skill in the art to perform the stamping / pattern forming operation of Funahata et al. in a vacuum chamber wherein the pressure in the chamber is below atmospheric pressure with the reasonable expectation of successfully and advantageously preventing air from being entrapped in the irregularities of the stamper (i.e., due to the vacuum environment) during the stamping process, thereby improving the quality of the transferred pattern in the resin film.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Takatsuka et al. (USPN 6,429,919 B1) teaches a method of manufacturing a reflecting plate for a reflection-type LCD in which a stamp having an inverted pattern is pressed into a layer to transfer the desired pattern of grooves into the aforementioned layer.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Wesley D Markham whose telephone number is (571) 272-1422. The examiner can normally be reached on Monday - Friday, 8:00 AM to 4:30 PM.


If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Shrive Beck can be reached on (571) 272-1415. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

WDM

WDM

Wesley D Markham
Examiner
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